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ABSTRACT

Since its inception in 1969, the National Assessment of Educational Progress (NAEP) has been regularly assessing the nation's students in public and private schools, serving as a barometer of educational attainment. This report in brief is excerpted from "NAEP 1992 Trends in Academic Progress," which presents trend data in science, mathematics, reading, and writing. Approximately 31,000 students were involved in NAEP's 1992 trend assessments. Student performance is characterized at five levels along the proficiency scales, and percentages of students reaching each level are presented. For reading and writing, results are also presented for individual tasks. In general, trends in science and mathematics show noteworthy improvements since 1983, while trends for reading show slow declines for the same period. Writing performance has been relatively stable for grades 11 and 4, with a recent improvement for grade 8 that awaits support in subsequent years. Eleven tables and four figures present trend data in brief form. (SLD)

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NATIONAL CENTER FOR EDUCATION STATISTICS

REPORT IN BRIEF

NAEP 1992 Trends in Academic Progress

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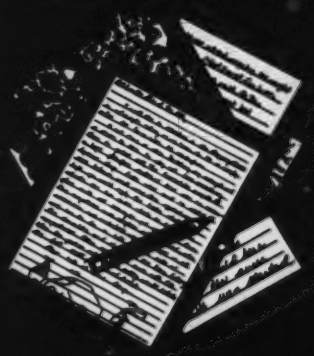

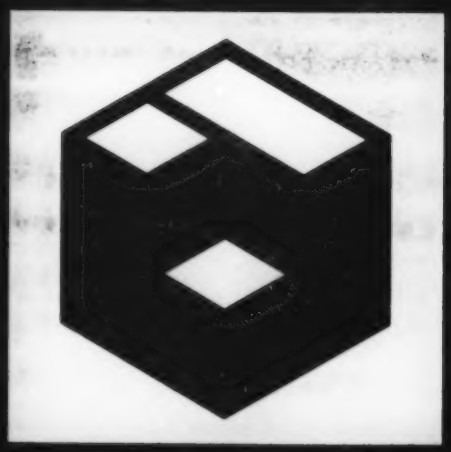

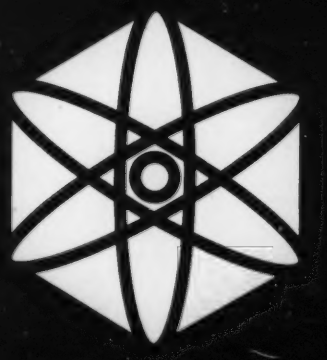

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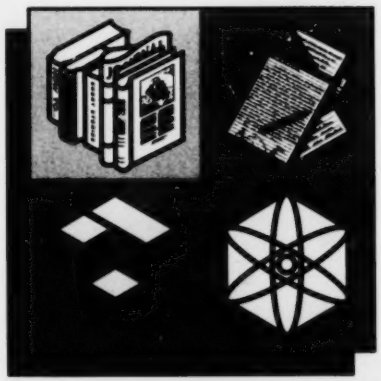

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Introduction

During the recent period of heightened awareness about the need for educational improvement, broad-based educational reforms have been recommended ranging from reorganizing schools to making extensive instructional changes within particular curricular areas. As part of the increased effort to stimulate academic improvement, in 1989 the President and governors adopted a set of six ambitious national education goals for the 21st century. These goals focused on ensuring that children start school ready to learn, raising high school graduation rates, increasing levels of educational achievement, promoting science and mathematics achievement as well as literacy and lifelong learning, and freeing schools of drugs and violence. In the Spring of 1994, Congress expanded the goals to also cover teacher preparation and parental involvement.

Since its inception in 1969, the National Assessment of Educational Progress (NAEP) has been regularly conducting assessments of the nation's students attending public and private schools. As such, it provides a barometer for gauging progress toward improved educational attainment for our nation's youth. In addition, NAEP's collection of information about a wide variety of background variables enables it to place current school practices in the context of recommended reforms. Through a series of *Report Cards* about student achievement in various curricular areas[1], focused reports about special issues such as problem solving or effective instruction in

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[1] Mullis, I.V.S., Dossey, J.A., Owen, E.H., & Phillips, G.W., *NAEP 1992 Mathematics Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, U.S. Government Printing Office, 1993).

Mullis, I.V.S., Campbell, J.R., & Farstrup, A.E., *NAEP 1992 Reading Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, U.S. Government Printing Office, 1993).

Applebee, A.N., Langer, J.A., Mullis, I.V.S., Latham, A.S., & Gentile, C.A., *NAEP 1992 Writing Report Card* (Washington, DC: National Center for Education Statistics, U.S. Government Printing Office, 1994).

mathematics, and technical documentation, NAEP provides a wealth of important information about student achievement and the contexts for schooling.

One of NAEP's special features is the ability to monitor trends in academic achievement in core curriculum areas since the early 1970s. By readministering materials and replicating procedures from assessment to assessment, NAEP provides valuable information about progress in academic achievement, and about whether the United States can meet the challenge of accomplishing its national education goals of improving achievement and becoming number one in the world in mathematics and science by the year 2000.

This report in brief is excerpted from *NAEP 1992 Trends in Academic Progress*, which presents NAEP's 1992 trend data in science, mathematics, reading, and writing. NAEP has used proficiency scales that range from 0 to 500 to summarize students' performance across a variety of multiple-choice and constructed-response questions and provide a basis for describing students' overall achievement in each of the four curriculum areas. Comparisons in average proficiency are provided across assessments and among subpopulations for representative samples of students in grades 4, 8, and 11 for writing and students aged 9, 13, and 17 for the other three curriculum areas. Approximately 31,000 students were involved in NAEP's 1992 trend assessments. To "anchor" or give meaning to the results, students' performance is characterized at five levels along the proficiency scales (150, 200, 250, 300, and 350), and the percentages of students reaching each level are presented. For reading and writing, results also are presented for individual tasks.

Overall Trends

The overall trends in science, mathematics, reading, and writing are presented in Figure 1. In general, the trends in science and mathematics show noteworthy improvements during the past decade since the 1983 publication of *A Nation at Risk*, while the trends for reading show declines during the same period.

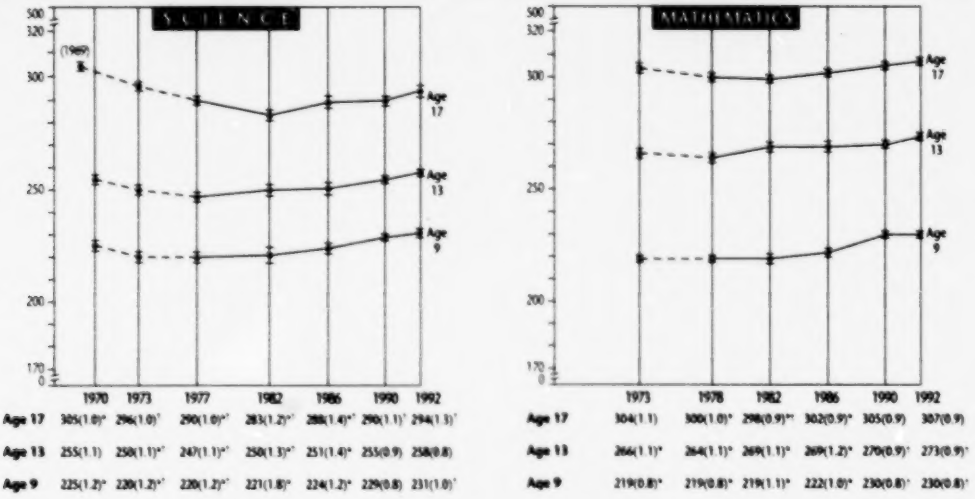
At all three ages, science performance declined significantly in the 1970s, but improved significantly during the 1980s. Compared to 1969-70, average achievement in 1992 was higher at age 9, essentially the same at age 13, and lower at age 17. Average mathematics proficiency improved between 1973 and 1992 at ages 9 and 13. The data at age 17 parallel the science trends, with declines in performance between 1973 and 1982 followed by recovery. In mathematics, at age 17, however, performance in 1992 had returned to the initial 1973 level.

Reading performance at age 9 improved significantly between 1971 and 1980, and then declined significantly between 1980 and 1992, returning essentially to the original level. At age 13, little change occurred from assessment to assessment, but average performance was higher in 1992 than 1971. Seventeen-year-olds made significant gains between 1971 and 1984, although virtually no change has been observed since then. Still, average reading achievement at age 17 was higher in 1992 than in 1971.

Between 1984 and 1992, the writing performance of eleventh graders showed little change. Also, writing performance has remained relatively stable at grade 4, despite a significant decrease in 1990 followed by a recovery in 1992. At grade 8, there was a significant decline between 1984 and 1990, followed by a significant improvement between 1990 and 1992. This unusually large gain for a two-year period initiated considerable scrutiny of operational and analytic procedures, yet no evidence was found that cast doubt on the results. Although much more subtle, the pattern at grade 4 was similar and the gains at grade 8 were pervasive across several measures of writing achievement. Still, such a large gain may be considered quite surprising, and the prudent approach is to wait and see if subsequent assessments through the 1990s confirm this improvement.

Figure 1

National Trends in Average Achievement in Science, Mathematics, Reading, and Writing



	1970	1973	1977	1982	1986	1990	1992
Age 17	305(1.0)*	296(1.0)†	290(1.0)*†	283(1.2)*†	288(1.4)*†	290(1.1)†	294(1.3)†
Age 13	255(1.1)	250(1.1)*†	249(1.1)*†	250(1.3)*†	251(1.4)*	255(0.9)	258(0.8)
Age 9	225(1.2)*	220(1.2)*†	220(1.2)*†	221(1.8)*†	224(1.2)*	229(0.8)	231(1.0)†

	1973	1978	1982	1986	1990	1992
Age 17	304(1.1)	300(1.0)*	298(0.9)*†	302(0.9)*	305(0.9)	307(0.9)
Age 13	266(1.1)*	264(1.1)*	269(1.1)*	269(1.2)*	270(0.9)†	273(0.9)†
Age 9	219(0.8)*	219(0.8)*	219(1.1)*	222(1.0)*	230(0.8)†	230(0.8)†

● 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

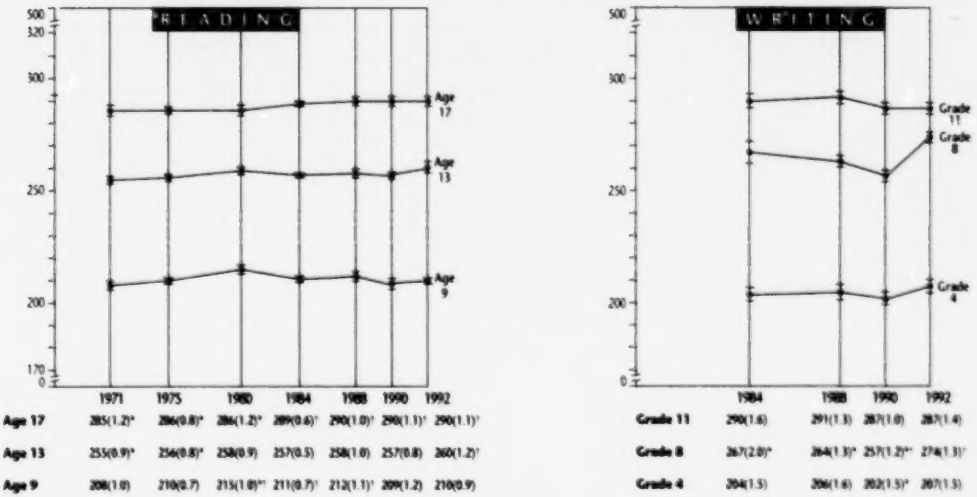
* Statistically significant difference from 1992, where alpha equals .05 per set of comparisons.

† Statistically significant difference from 1969-70 for science, 1973 for mathematics, 1971 for reading, and 1984 for writing, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details).

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Science, Mathematics, Reading, and Writing Trend Assessments.

For science and mathematics:

- In the long term, with the exception of science performance at age 17, average achievement in 1992 was at least as high as in the early 1970s, if not higher.
- The declines in science achievement as well as in mathematics at age 17 during the 1970s were followed by a period of recovery from 1982 to 1992.
- For both science and mathematics, students at all three ages made gains in average proficiency between 1982 and 1992.



	1971	1975	1980	1984	1988	1990	1992
Age 17	285(1.2)*	286(0.8)*	286(1.2)*	289(0.6)†	290(1.0)†	290(1.1)†	290(1.1)†
Age 13	255(0.9)*	256(0.8)*	258(0.9)	257(0.5)	258(1.0)	257(0.8)	260(1.2)†
Age 9	208(1.0)	210(0.7)	215(1.0)*†	211(0.7)†	212(1.1)†	209(1.2)	210(0.9)

	1984	1988	1990	1992
Grade 11	290(1.6)	291(1.3)	287(1.0)	287(1.4)
Grade 8	267(2.0)*	264(1.3)*	257(1.2)*†	274(1.3)†
Grade 4	204(1.5)	206(1.6)	202(1.5)*	207(1.3)

● 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.
* Statistically significant difference from 1992, where alpha equals .05 per set of comparisons.
† Statistically significant difference from 1969-70 for science, 1973 for mathematics, 1971 for reading, and 1984 for writing, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details).
SOURCE: National Assessment of Educational Progress (NAEP), 1992 Science, Mathematics, Reading, and Writing Trend Assessments.

For reading and writing:

- Similar to the trends in science and mathematics, average reading achievement is at least as high, if not higher, than in 1971.
- During the 1980s there was a significant decline in reading achievement at age 9. With the exception of the improvement in writing at grade 8, there have been no significant improvements in reading or writing performance since 1984.

Trends in Levels of Proficiency

Information about student performance at various levels on the NAEP proficiency scales and trends in that performance across the assessments is available back to 1977 in science, 1978 in mathematics, 1971 in reading, and 1984 in writing. Essentially, the trends in levels of performance reflect the overall trends.

- Greater percentages of 9-year-olds demonstrated understanding of the fundamentals in science and mathematics (Levels 150, 200, and 250), but the percentages reaching various points on the reading scale were virtually identical in 1971 and 1992. Also, the percentages of fourth graders reaching various points on the writing scale were essentially the same between 1984 and 1992.
- At age 13, virtually all students reached Level 150 in science and mathematics, and gains were observed at Levels 200 and 250. In reading and writing, no significant changes were observed at the lower scale levels, but higher percentages reached Level 300.
- At age 17, gains generally were noted in all curriculum areas at Levels 250 and 300 with the exception of writing. Despite these signs of progress, however, in 1992, 10 percent or fewer of the high school students reached Level 350 in any of the four curriculum areas and the percentages have not changed significantly between the baseline assessments and 1992.

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Table 1

Trends in Percentages of Students Performing At or Above Science Proficiency Levels, Ages 9, 13, and 17, 1977 to 1992

Level	AGE 9		AGE 13		AGE 17	
	Percent in 1992	Percent in 1977	Percent in 1992	Percent in 1977	Percent in 1992	Percent in 1977
350 Can infer relationship and draw conclusions using detailed scientific knowledge	0(0.1)	0(0.0)	0(0.1)	1(0.1)*	10(0.7)	8(0.4)
300 Has some detailed scientific knowledge and can evaluate the appropriateness of scientific procedures	3(0.3)	3(0.3)	12(0.8)	11(0.5)	47(1.5)	42(0.9)*
250 Understands and applies general information from the life and physical sciences	33(1.0)	26(0.7)*	61(1.1)	49(1.1)*	83(1.2)	82(0.7)
200 Understands some simple principles and has some knowledge, for example, about plants and animals	78(1.2)	68(1.1)*	93(0.5)	86(0.7)*	98(0.5)	97(0.2)
150 Knows everyday science facts	97(0.3)	94(0.6)*	100(0.1)	98(0.2)*	100(0.0)	100(0.0)

* Statistically significant difference from 1992, where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Science Trend Assessment.

Science. Compared to 1977, increased percentages of 9- and 13-year-olds performed at or above Levels 150, 200, and 250, indicating an improved grasp of general scientific information (see Table 1). Also, in 1992, greater percentages of 17-year-olds reached Level 300, demonstrating some detailed knowledge and analytic understanding of scientific procedures. The percentage of 13-year-olds attaining Level 300, however, remained essentially unchanged (12 percent), as did the percentage of 17-year-olds attaining Level 350 (10 percent).

Mathematics. As shown in Table 2, the trends across proficiency levels for mathematics show a picture similar to that for science. Improvements were observed between 1978 and 1992 for the three lower scale levels at age 9, for Levels 200 and 250 at age 13, and for Levels 250 and 300 at age 17. The percentage of 13-year-olds attaining Level 300, however, remained virtually the same (19 percent) between 1978 and 1992, as did the percentage of 17-year-olds attaining Level 350 (7 percent).

Table 2

Trends in Percentages of Students Performing At or Above Mathematics Proficiency Levels, Ages 9, 13, and 17, 1978 to 1992

	AGE 9		AGE 13		AGE 17	
Level	Percent in 1992	Percent in 1978	Percent in 1992	Percent in 1978	Percent in 1992	Percent in 1978
350 Can solve multi-step problems and use beginning algebra	0(0.0)	0(0.0)	0(0.2)	1(0.2)	7(0.6)	7(0.4)
300 Can compute with decimals, fractions, and percents; recognize geometric figures; solve simple equations; and use moderately complex reasoning	1(0.3)	1(0.1)	19(1.0)	18(0.7)	59(1.3)	52(1.1)*
250 Can add, subtract, multiply, and divide using whole numbers, and solve one-step problems	28(0.9)	20(0.7)*	78(1.1)	65(1.2)*	97(0.5)	92(0.5)*
200 Can add and subtract two-digit numbers and recognize relationships among coins	81(0.8)	70(0.9)*	99(0.3)	95(0.5)*	100(0.0)	100(0.1)
150 Knows some addition and subtraction facts	99(0.2)	97(0.3)*	100(0.0)	100(0.1)	100(0.0)	100(0.0)

* Statistically significant difference from 1992, where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Mathematics Trend Assessment.

Table 3

Trends in Percentages of Students Performing At or Above Reading Proficiency Levels, Ages 9, 13, and 17, 1971 to 1992

Level	AGE 9		AGE 13		AGE 17	
	Percent in 1992	Percent in 1971	Percent in 1992	Percent in 1971	Percent in 1992	Percent in 1971
350 Can synthesize and learn from specialized reading materials	0(0.0)	0(0.0)	1(0.3)	0(0.0)	7(0.6)	7(0.4)
300 Can find, understand, summarize, and explain relatively complicated information	1(0.2)	1(0.1)	15(0.9)	10(0.5)*	43(1.1)	39(1.0)*
250 Can search for specific information, interrelate ideas, and make generalizations	16(0.8)	16(0.6)	62(1.4)	58(1.1)	82(0.8)	79(0.9)*
200 Can comprehend specific or sequentially related information	62(1.1)	59(1.0)	93(0.7)	93(0.5)	97(0.4)	96(0.3)
150 Can carry out simple, discrete reading tasks	92(0.4)	91(0.5)	100(0.3)	100(0.0)	100(0.1)	100(0.1)

* Statistically significant difference from 1992, where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Reading Trend Assessment.

Reading.
The trends in reading across proficiency levels show little difference between 1971 and 1992, especially at age 9. As presented in Table 3, modest improvement was observed at age 13 for Level 300, and at age 17 for Levels 250 and 300.

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Writing. For fourth, eighth, and eleventh graders, few changes were observed in writing achievement between 1984 and 1992. As shown in Table 4, increased percentages of eighth graders reached Levels 300 and 350, while performance at grades 4 and 12 was similar across assessments.

Table 4

Trends in Percentages of Students Performing At or Above Writing Proficiency Levels, Grades 4, 8, and 11, 1984 to 1992

Level		GRADE 4		GRADE 8		GRADE 11	
		Percent in 1992	Percent in 1984	Percent in 1992	Percent in 1984	Percent in 1992	Percent in 1984
350	Can write effective responses containing supportive details and discussion	0(0.0)	0(0.0)	2(0.3)	0(0.1)*	2(0.4)	2(0.7)
300	Can write complete responses containing sufficient information	0(0.2)	0(0.4)	25(1.5)	13(1.8)*	36(1.9)	39(2.4)
250	Can begin to write focused and clear responses to tasks	13(1.1)	10(1.0)	75(1.4)	72(2.6)	87(1.3)	89(1.0)
200	Can write partial or vague responses to tasks	58(1.9)	54(2.0)	98(0.4)	98(0.9)	100(0.2)	100(0.3)
150	Can respond to tasks in abbreviated, disjointed, or unclear ways	93(0.5)	93(1.3)	100(0.1)	100(0.0)	100(0.0)	100(0.0)

* Statistically significant difference from 1992, where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Writing Trend Assessment.

Table 5

Trends Since the 1970s in Average Proficiency in Science, Mathematics, and Reading by Race/Ethnicity and Gender

	AGE 9		AGE 13		AGE 17	
SCIENCE	**Proficiency in 1992**	**Proficiency in 1970†**	**Proficiency in 1992**	**Proficiency in 1970†**	**Proficiency in 1990**	**Proficiency in 1969†**
Nation	231(1.0)	225(1.2)*	258(0.8)	255(1.1)	294(1.3)	305(1.0)*
White	239(1.0)	236(0.9)	267(1.0)	263(0.8)*	304(1.3)	312(0.8)*
Black	200(2.7)	179(1.9)*	224(2.7)	215(2.4)	256(3.2)	258(1.5)
Hispanic	205(2.8)	192(2.7)*	238(2.6)	213(1.9)*	270(5.6)	262(2.2)
Male	235(1.2)	228(1.3)*	260(1.2)	257(1.3)	299(1.7)	314(1.2)*
Female	227(1.0)	223(1.2)	256(1.0)	253(1.2)	289(1.5)	297(1.1)*
MATHEMATICS	**Proficiency in 1992**	**Proficiency in 1973**	**Proficiency in 1992**	**Proficiency in 1973**	**Proficiency in 1992**	**Proficiency in 1973**
Nation	230(0.8)	219(0.8)*	273(0.9)	266(1.1)*	307(0.9)	304(1.1)
White	235(0.8)	225(1.0)*	279(0.9)	274(0.9)*	312(0.8)	310(1.1)
Black	208(2.0)	190(1.8)*	250(1.9)	228(1.9)*	286(2.2)	270(1.3)*
Hispanic	212(2.3)	202(2.4)*	259(1.8)	239(2.2)*	292(2.6)	277(2.2)*
Male	231(1.0)	218(0.7)*	274(1.1)	265(1.3)*	309(1.1)	309(1.2)
Female	228(1.0)	220(1.1)*	272(1.0)	267(1.1)*	304(1.1)	301(1.1)
READING	**Proficiency in 1992**	**Proficiency in 1971†**	**Proficiency in 1992**	**Proficiency in 1971†**	**Proficiency in 1992**	**Proficiency in 1971†**
Nation	210(0.9)	208(1.0)	260(1.2)	255(0.9)*	290(1.1)	285(1.2)*
White	218(1.0)	214(0.9)*	266(1.2)	261(0.7)*	297(1.4)	291(1.0)*
Black	184(2.2)	170(1.7)*	238(2.3)	222(1.2)*	261(2.1)	239(1.7)*
Hispanic	192(3.1)	183(2.2)	239(3.5)	232(3.0)	271(3.7)	252(3.5)*
Male	206(1.3)	201(1.1)*	254(1.7)	250(1.0)	284(1.6)	279(1.2)*
Female	215(0.9)	214(1.0)	265(1.2)	261(0.9)*	296(1.1)	291(1.3)

† NOTE: For Hispanic students, the science differences are calculated between 1977 and 1992, and the reading differences are calculated between 1975 and 1992.

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

Trends in Performance by Race/Ethnicity

Changes in average achievement across the NAEP trend assessments in science, mathematics, reading, and writing are presented by race/ethnicity and gender in Table 5.

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Since the initial trend assessments in the early 1970s, the overall gains in science, mathematics, and reading achievement have been reflected in increased performance by White, Black, and Hispanic students. However, the results differ somewhat by curriculum area.

- In science, White students had increased average achievement at ages 13 and 17, Black students at age 9, and Hispanic students at ages 9 and 13.
- In mathematics, all three racial/ethnic groups showed improvement at all three ages, with the exception of White 17-year-olds.
- In reading, White and Black students had increased average proficiency at all three ages, as did Hispanic 17-year-olds.

Trends in performance by racial/ethnic subgroups, however, parallel the national trends of more improvement recently in science and mathematics than in reading and writing. Table 6 presents the trends in average performance by race/ethnicity and gender between 1982 and 1992 for science and mathematics, and between 1984 and 1992 for reading and writing.

Table 6

Trends Since the 1980s in Average Proficiency in Science, Mathematics, Reading, and Writing by Race/Ethnicity, and Gender

	AGE 9		AGE 13		AGE 17	
SCIENCE	**Proficiency in 1992**	**Proficiency in 1982**	**Proficiency in 1992**	**Proficiency in 1982**	**Proficiency in 1992**	**Proficiency in 1982**
Nation	231(1.0)	221(1.8)*	258(0.8)	250(1.3)*	294(1.3)	283(1.2)*
White	239(1.0)	229(1.9)*	267(1.0)	257(1.1)*	304(1.3)	293(1.0)*
Black	200(2.7)	187(3.0)*	224(2.7)	217(1.3)	256(3.2)	235(1.7)*
Hispanic	205(2.8)	189(4.2)*	238(2.6)	226(3.9)*	270(5.6)	249(2.3)*
Male	235(1.2)	221(2.3)*	260(1.2)	256(1.5)	299(1.7)	292(1.4)*
Female	227(1.0)	221(2.0)*	256(1.0)	245(1.3)*	289(1.5)	275(1.3)*
MATHEMATICS						
Nation	230(0.8)	219(1.1)*	273(0.9)	269(1.1)*	307(0.9)	298(0.9)*
White	235(0.8)	224(1.1)*	279(0.9)	274(1.0)*	312(0.8)	304(0.9)*
Black	208(2.0)	195(1.6)*	250(1.9)	240(1.6)*	286(2.2)	272(1.2)*
Hispanic	212(2.3)	204(1.3)*	259(1.8)	252(1.7)*	292(2.6)	277(1.8)*
Male	231(1.0)	217(1.2)*	274(1.1)	269(1.4)*	309(1.1)	302(1.0)*
Female	228(1.0)	221(1.2)*	272(1.0)	268(1.1)*	304(1.1)	296(1.0)*
READING	**Proficiency in 1992**	**Proficiency in 1984**	**Proficiency in 1992**	**Proficiency in 1984**	**Proficiency in 1992**	**Proficiency in 1984**
Nation	210(0.9)	211(0.7)	260(1.2)	257(0.5)	290(1.1)	289(0.6)
White	218(1.0)	218(0.8)	266(1.2)	263(0.6)*	297(1.4)	295(0.7)
Black	184(2.2)	186(1.1)	238(2.3)	236(1.0)	261(2.1)	264(1.0)
Hispanic	192(3.1)	187(2.1)	239(3.5)	240(1.7)	271(3.7)	268(2.2)
Male	206(1.3)	208(0.8)	254(1.7)	253(0.6)	284(1.6)	284(0.6)
Female	215(0.9)	214(0.8)	265(1.2)	262(0.6)	296(1.1)	294(0.8)
	Grade 4		**Grade 8**		**Grade 11**	
WRITING	**Proficiency in 1992**	**Proficiency in 1984**	**Proficiency in 1992**	**Proficiency in 1984**	**Proficiency in 1992**	**Proficiency in 1984**
Nation	207(1.5)	204(1.5)	274(1.3)	267(2.0)*	287(1.4)	290(1.6)
White	217(1.7)	211(1.9)	279(1.3)	272(2.1)*	294(1.2)	297(1.8)
Black	175(3.8)	182(5.0)	258(4.0)	247(5.7)	263(3.2)	270(3.6)
Hispanic	189(3.6)	188(5.8)	265(2.2)	247(6.4)*	274(3.8)	259(6.6)
Male	198(1.7)	200(2.8)	264(1.9)	258(2.3)	279(1.2)	281(1.4)
Female	216(1.7)	208(3.1)*	285(1.3)	276(2.4)*	296(2.0)	299(2.5)

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

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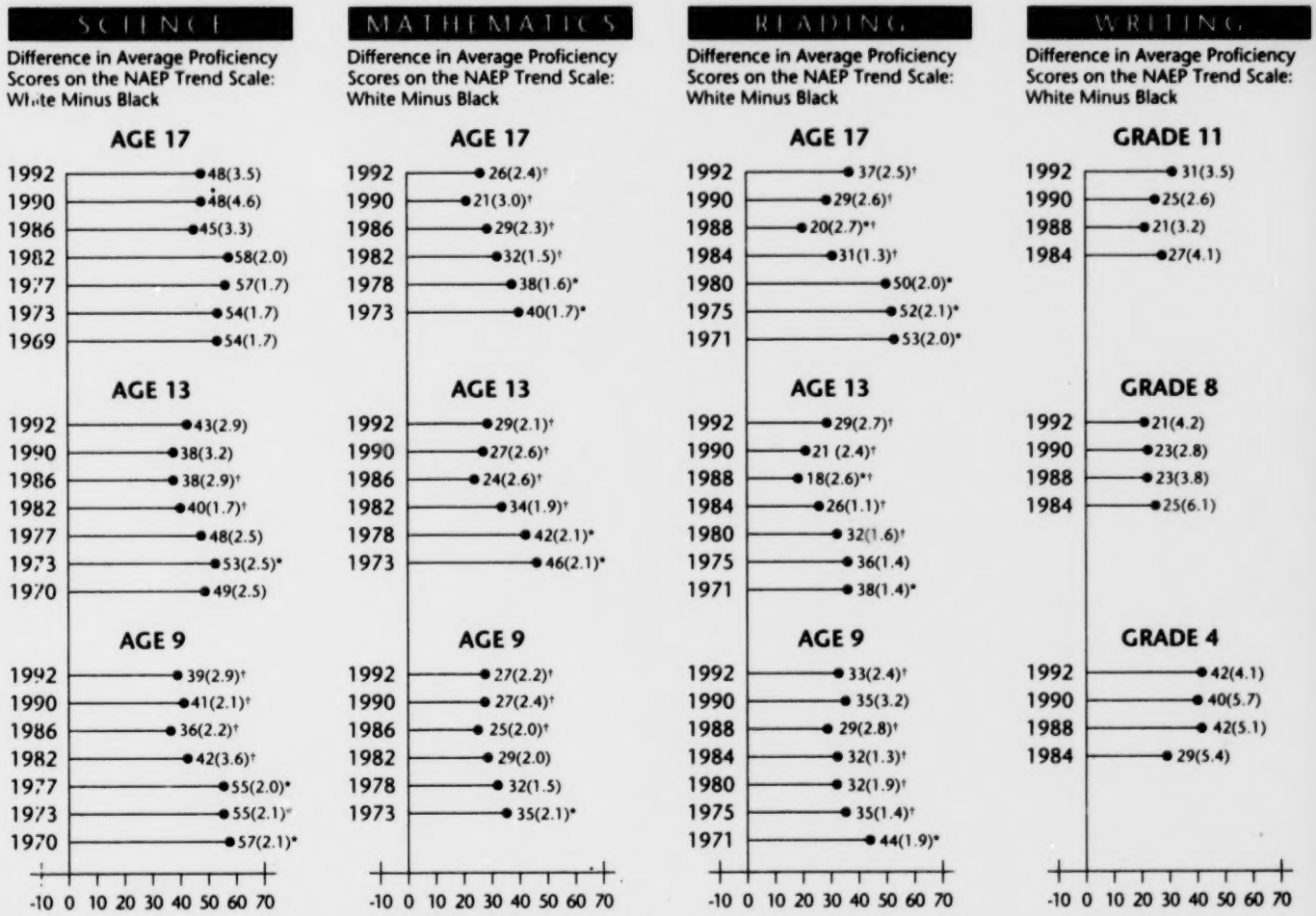
In the past decade, all three racial/ethnic subgroups showed improvements in both science and mathematics at all three ages, with the exception of Black 13-year-olds in science.

In contrast, there have been few recent improvements in reading and writing achievement. Between 1984 and 1992, there were no significant increases in average reading proficiency for White, Black, and Hispanic students at any of the three ages, except for White 13-year-olds. The only increases in average writing achievement were observed for White and Hispanic students at grade 8. Black students have not demonstrated improved achievement in these important literacy skills since 1984, and at age 17 have shown declines in average reading performance since 1988.

A stated objective of the national education goal emphasizing increases in students' academic achievement and citizenship is that the performance distribution for minority students will more closely reflect the student population as a whole. As shown in Figure 2, the differences in average proficiency between White and Black students have narrowed at all three ages in mathematics and reading, and at age 9 in science. Differences in average proficiency between White and Hispanic students also have narrowed at age 13 in science and mathematics, and at age 17 in mathematics and reading (see Figure 3).

Figure 2

Trends in Differences in Average Proficiency of White and Black Students Across Subject Areas



* Statistically significant difference from 1992 at about the 95 percent confidence level.

† Statistically significant difference from the initial assessment year in each subject. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors for the sample. In comparing two estimates, one must use the standard error of the difference.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment

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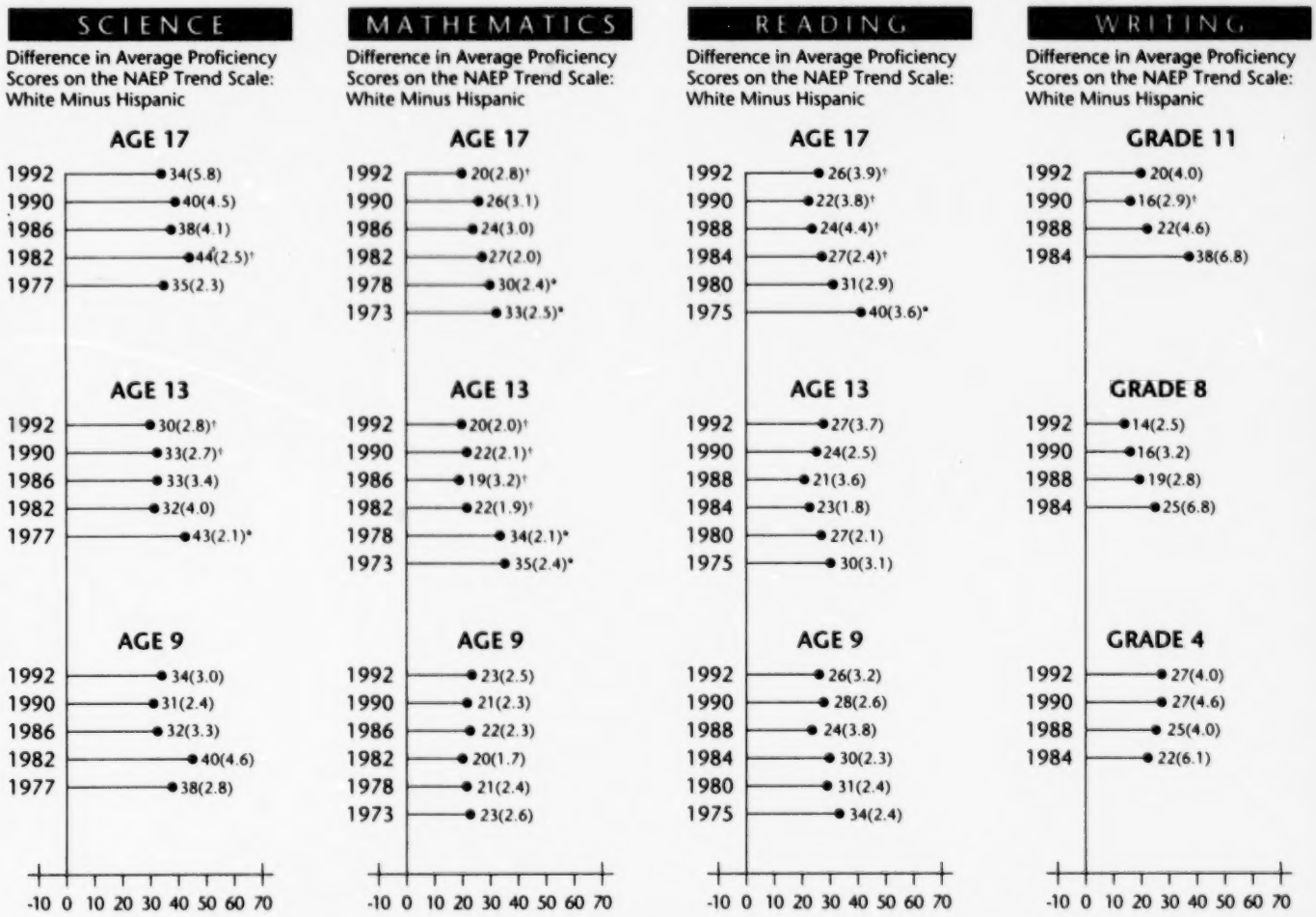
Despite progress in reducing the performance differences across the past two decades, however, the gaps remain large. In 1992, both Black and Hispanic students, on average, demonstrated significantly lower proficiency than White students. This overall difference occurred notwithstanding the fact that students from all three racial/ethnic groups demonstrated performance across a range from high to low achievement.

Further, the trends in performance differences among the three racial/ethnic groups since 1986 in science and mathematics and since 1988 in reading and writing indicate that progress in closing the gaps has stalled. In fact, at ages 13 and 17, the achievement gaps between White and Black students have increased since 1988. During the same time period, performance differences between White and Hispanic students also remained quite constant.

Figure 3

Trends in Differences in Average Proficiency of White and Hispanic Students Across Subject Areas



* Statistically significant difference from 1992 at about the 95 percent confidence level.

† Statistically significant difference from the initial assessment year in each subject. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors for the sample. In comparing two estimates, one must use the standard error of the difference.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment

Trends in Performance by Gender

As shown in Table 5, the long-term gains in science, mathematics, and reading by gender have been somewhat inconsistent. Males showed improvement at ages 9 and 17 in science and reading, and at ages 9 and 13 in mathematics. Females showed improvement at age 17 in science, at ages 9 and 13 in mathematics, and at age 13 in reading.

The recent trends shown in Table 6 reveal that both genders had gains between 1982 and 1992 in average proficiency in science and mathematics at all three ages, with the exception of males at age 13. Since 1984, however, neither gender showed improvement in reading or writing achievement at any of the three ages, except for females at grades 4 and 8 in writing.

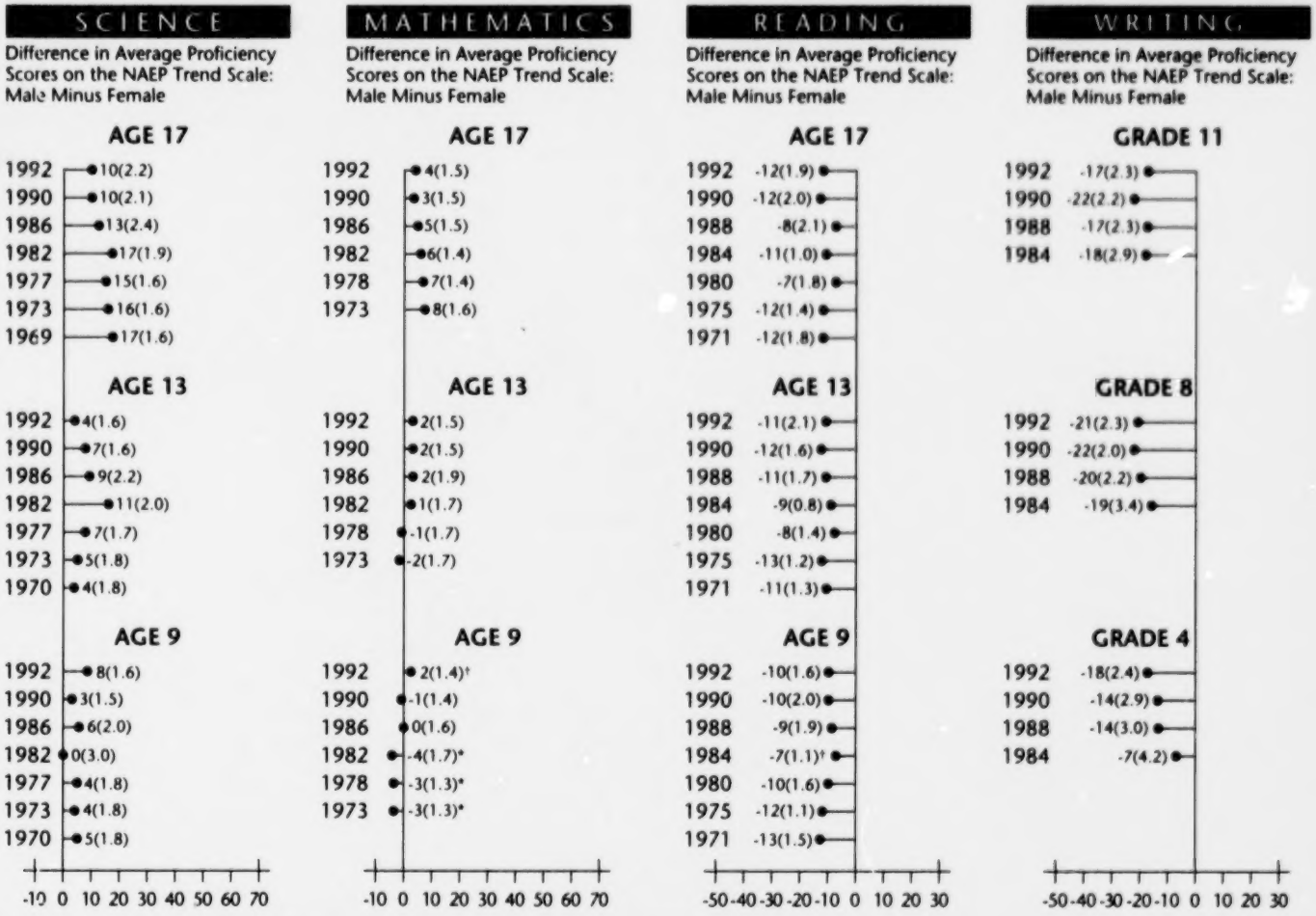
The trends in performance differences by gender are shown in Figure 4. In 1992, males had higher average science achievement than females at all three ages. Despite some fluctuations, none of the apparent changes in the gender gap resulted in a statistically significant difference since 1969-70.

In mathematics between 1973 and 1992, the slight advantage favoring females at age 9 reversed to a slight advantage favoring males. A similar, but not statistically significant, pattern was observed at age 13. At age 17, the slight narrowing of the gender gap was not statistically significant.

In reading, at all three ages the gender performance differences favoring females were essentially identical in 1971 and more than 20 years later in 1992. In writing during the eight years between 1984 and 1992, females consistently had higher average proficiency than males at grades 4, 8, and 11. The apparent increase in the gap at grade 4 (from 7 to 18 points) was not statistically significant.

Figure 4

Trends in Differences in Average Proficiency of Male and Female Students Across Subject Areas



* Statistically significant difference from 1992 at about the 95 percent confidence level.

† Statistically significant difference from the initial assessment year in each subject. The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors for the sample. In comparing two estimates, one must use the standard error of the difference.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment

Trends in School and Home Contexts for Learning

The results for background questions about school and home contexts for learning indicated relatively few changes. There were, however, some positive trends in students' reports about their schooling.

Students reported an increase in science and mathematics coursework, even though the percentages taking advanced courses remained low. Between 1986 and 1992, the percentage of 17-year-olds (primarily eleventh graders) who had studied biology increased from 88 to 92 percent, the percentage who had studied chemistry increased from 40 to 49 percent, and the percentage who had studied physics from 10 to 14 percent. In mathematics at age 13 (primarily eighth graders), there was a decrease in the percentage taking regular mathematics — from 60 to 51 percent — and an increase in those studying pre-algebra — from 19 to 27 percent. The percentages studying algebra — 17 percent — or other coursework (5 percent) remained relatively stable.

As shown in Table 7, an increase in somewhat more advanced mathematics coursework also was reported by the high school students. Between 1978 and 1992, the percentage of 17-year-olds who had only studied pre-algebra or general mathematics decreased significantly from 20 to 14 percent as did the percentage who had taken Algebra I but no more mathematics courses — from 17 to 14 percent. Those pursuing their coursework through Algebra II increased from 37 to 45 percent and those taking precalculus or calculus from 6 to 10 percent.

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Table 7
Highest Level of Mathematics Coursework, Age 17

	PERCENTAGE OF STUDENTS				
	General Mathematics or Pre-Algebra	Algebra I	Geometry	Algebra II	Precalculus or Calculus
1992	14(1.1)	14(0.8)	16(0.9)	45(1.6)	10(0.8)
1978	20(1.0)*	17(0.6)*	16(0.6)	37(1.2)*	6(0.4)*

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

In writing, between 1984 and 1992, eighth and eleventh graders reported an increase in teachers' comments about their ideas and feelings, and less attention to marking mistakes. At grades 4, 8, and 11, increased percentages of students reported engaging in a variety of writing activities, and they reported using more complex writing strategies.

Students also reported increased use of technology in the classroom. Between 1977 and 1992, greater percentages (7 to 11 percent) of 9-year-olds reported having used a calculator, thermometer, or microscope. In 1992, 98 percent reported having used a calculator, 91 percent a thermometer, and 62 percent a microscope.

As illustrated in Table 8, computers are being used much more than they were a decade or so ago. At ages 13 and 17, from 1978 to 1992, students reported considerably more access to and use of computers in mathematics class. At all three ages, students demonstrated improved performance in calculator use during that same time period. Also, between 1984 and 1992, there was a sharp increase in the percentage of students at all three grades (4, 8, and 11) who reported using computers to write stories or papers.

According to their reports, increased percentages of students were spending at least some time on homework each night. More 9-year-olds reported at least some time (less than one hour) spent on homework across their subjects in 1992 than in 1984, from 42 to 47 percent. Also, more 17-year-olds reported time spent on mathematics homework in 1992 than in 1978. The percentage reporting that they often did mathematics homework increased from 59 to 76 percent, while the percentage who said they only sometimes did homework decreased from 35 to 19 percent. However, 5 percent reported never doing mathematics homework and this figure did not change. Also unchanged was the finding that one-third of the students at age 17 reported that they typically do not have or do daily homework across all their school subjects.

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Table 8

Computer Usage in Mathematics and Writing Instruction, Ages 13 and 17

		PERCENTAGE OF STUDENTS ANSWERING "YES"	
		AGE 13	AGE 17
Studied Mathematics Through	1992	53(2.4)	35(2.0)
Computer Instruction	1978	14(0.9)*	12(1.1)*
		GRADE 8	GRADE 11
Used a Computer To Write	1992	71(1.9)	82(2.0)
Stories or Papers	1984	14(3.1)*	17(2.1)*

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

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There was evidence of somewhat more time spent on reading for school between 1984 and 1992. At ages 9 and 13, students reported some increase in the pages read each day for all of their subjects, and at ages 13 and 17 students reported some increases for various types of materials read. Still, as shown in Table 9, the amount of reading done for school remains quite low.

Approximately one-half the students at all three ages reported reading 10 or fewer pages per day for their schoolwork, either in school or for homework.

Students' perceptions about the value of learning science, mathematics, reading, and writing have been relatively stable across assessments. However, a few positive signs were noted. Between 1977 and 1992, more 17-year-olds reported that science should be required in school, up from 62 to 76 percent. Increased percentages of students at ages 13 and 17 believed that science could help solve a number of global problems; the exception was the problem of world starvation, which a decreased percentage thought that science could help solve. Between 1984 and 1992, greater percentages of students at grades 4 and 11 agreed that writing was of value for communication and employment, and at grades 8 and 11 more reported that writing had some personal and social uses. For example, the percentage of eleventh graders agreeing that "people who write will have a better chance of getting good jobs" rose from 54 to 59 percent.

Based on the relatively small number of questions asked, home contexts for learning appeared to have changed little from assessment to assessment. Between 1984 and 1992, across the ages and grades assessed, students reported that family members were writing more, but reported little change in the extent of reading in the home. Smaller percentages of students reported access to a variety of reading materials in the home. At age 9, students reported no change in the amount of reading for fun, although there was a reported increase in literacy-related activities such as telling a friend about a good book. Finally, at all three ages, students reported an overall increase in their amount of daily television viewing over the past decade, but no change in family rules about watching television since 1986.

Table 9

Pages Read in School and for Homework, Ages 9, 13, and 17

		PERCENTAGES OF STUDENTS		
		AGE 9	AGE 13	AGE 17
More than 20	1992	19(1.0)	14(1.1)	22(1.2)
	1984	13(0.4)*	10(0.4)*	20(1.0)
16 to 20 pages	1992	14(0.5)	13(0.6)	14(0.5)
	1984	13(0.5)	11(0.2)	14(0.4)
11 to 15 pages	1992	14(0.6)	19(0.6)	17(0.6)
	1984	14(0.5)	18(0.4)	18(0.3)
6 to 10 pages	1992	25(0.7)	31(0.8)	26(0.8)
	1984	25(0.5)	35(0.5)*	26(0.6)
5 or fewer	1992	29(1.0)	23(0.9)	20(1.0)
	1984	35(1.0)*	26(0.6)*	21(0.8)

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

Considering that average reading achievement has not improved at any of the three ages since 1984, and has shown signs of declines during the 1980s at age 9 and among Black 17-year-olds, the low amount of reading by our nation's students is worth some attention. As shown in Table 9, these students report very few pages read for their schoolwork each day. As revealed in Table 10, reading for fun was reported as a daily activity by only 56 percent of the 9-year-olds. Further, daily reading for pleasure decreases for older students. In 1992, only 27 percent of the 17-year-olds reported reading for fun on a daily basis and 40 percent reported reading for fun on a monthly basis or even less frequently.

Table 10

Trends in Reading for Fun, Ages 9, 13, and 17

		PERCENTAGES OF STUDENTS		
		AGE 9	AGE 13	AGE 17
Daily	1992	56(1.2)	37(2.4)	27(1.5)
	1984	53(1.0)	35(1.0)	31(0.8)
Weekly	1992	28(1.2)	32(1.8)	33(1.5)
	1984	28(0.8)	35(1.2)	34(1.1)
Monthly	1992	6(0.5)	13(1.5)	18(1.4)
	1984	7(0.6)	14(0.8)	17(0.5)
Yearly	1992	3(0.4)	8(1.1)	12(1.2)
	1984	3(0.3)	7(0.5)	10(0.5)
Never	1992	7(0.7)	10(1.5)	11(1.3)
	1984	9(0.5)	8(0.6)	9(0.6)

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

In contrast to the lack of change in the amount of students' leisure reading, they reported some increase in television viewing (see Table 11). Also, it should be noted that in 1992, from 47 to 64 percent of these students across the three age groups found time to watch three or more hours of television each day.

Table 11

Trends in Television Watching, Ages 9, 13, and 17

	PERCENTAGE OF STUDENTS		
	NUMBER OF HOURS WATCHED PER DAY		
	0-2 Hours	3-5 Hours	6 or More Hours
Age 9			
1992	40(1.0)	41(0.8)	19(0.8)
1982	44(1.1)*	29(0.6)*	26(1.0)*
Age 13			
1992	36(1.1)	51(1.0)	13(0.6)
1982	45(0.8)*	39(0.4)*	16(0.8)*
Age 17			
1992	53(1.4)	40(1.1)	7(0.5)
1978	69(0.7)	26(0.6)*	5(0.2)*

* Statistically significant difference from 1992 where alpha equals .05 per set of comparisons. The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. In comparing two estimates, one must use the standard error of the difference (see Appendix for details). When the percentages of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages 0.5 or less were rounded to 0 percent.

SOURCE: National Assessment of Educational Progress (NAEP), 1992 Trend Assessment.

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Acknowledgments

The work presented herein represents the efforts of the hundreds of individuals who are necessary to implement a project of this scope across several decades. From the considerable expertise, energy, and dedication required to develop and conduct NAEP's trend assessments to that necessary to analyze and report the data, many persons have made important and substantial contributions. Most importantly, NAEP is grateful to students and school staff who made the trend assessments possible.

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